APPENDIX A

Statistical Analysis

0.00 INTRODUCTION

0.01 This study was carried out according to the protocol contained in Appendix D.

0.02 Twenty-four laboratories participated in this study. Some of these laboratories used more than one instrument, or used both sets of ambient conditions allowed by the protocol
(ISO 187: 1990 or ISO 3402: 1991).

0.03 Data sets were generated for each of the instruments and/or ambient conditions used within each laboratory.

0.04 For the purposes of this analysis each data set was regarded as having come from a different laboratory, even though some of them arose from measurements taken in the same establishment (see 0.03 above).

0.05 Thus, for the purposes of the statistical analysis, the data is regarded as having arisen from 29 laboratories.

1.00 EXPERIMENT SIZE

1.01 Six papers were tested on each of 3 days, with 30 measurements of permeability being taken from 3 strips of each paper on each day. The total number of measurements for each paper were

Paper A	2520
Paper B	2520
Paper C	2340
Paper D	2340
Paper E	2430
Paper F	2340

Total number of readings = 14490

1.02 The number of measurements varied slightly for each paper because not all laboratories tested all the papers. This did not influence the analysis since the data from each paper was analysed separately.

2.00 ANOMALOUS DATA POINTS

2.01 For each laboratory the data for each paper were analysed separately using an analysis of variance, treating between days, and between strips within days, as random effects. Any single observation that was more than 3 standard errors away from the expected value was deemed to be anomalous.

2.02 The search for anomalous data points showed the following:-

Paper A	11	or	0.44%
Paper B	9		0.36%
Paper C	1		0.04%
Paper D	6		0.26%
Paper E	6		0.25%
Paper F	10		0.43%

Total of anomalous points = 43 0.30%

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2.03 For this study, means of 10 measurements are the basis of the calculation of r and R.

2.04 Anomalous results of the means of 10 measurements were detected as follows. For each laboratory the mean of the 10 measurements taken on each strip was calculated. The data from each paper were analysed separately using an analysis of variance, treating between laboratories, between days within laboratories, and between strips within days, as random effects. Any observation (mean of 10 measurements) that was more than 3 standard errors away from the expected value was deemed to be anomalous.

2.05 With such a low percentage of anomalous data points in the raw data it is not surprising that a scan of the means of 10 for anomalous results found very few. In fact there were only 3, all for paper F.

2.06 The validity of some of these anomalous data points was investigated by the laboratory providing the data. In all cases they were found to be genuine observations.

2.07 Since the number of anomalous data points was so low, and since it was evident that a portion of these were in fact genuine observations, it was decided to use all the reported data in the analysis. No data point were deleted as outliers

3.00 FIRST ANALYSIS

3.01 The statistical model used for the first analysis is given in 2.01 above. The results are shown in Figures 1 to 6.

3.02 The diagrammatic plot of the laboratory means given in Figure 1 would seem to indicate that laboratory 61 is an outlier. This hypothesis was tested (using the Grubbs test) but the result was not significant.

3.03 From Figure 2, the high within laboratory standard deviation of 2.242 for laboratory 141 was tested as an outlier (using Cochran's test) but the result was not significant.

3.04 From Figure 3, the low result for laboratory 212 was tested as an outlier (using the Grubbs test) but the result was not significant.

3.05 From Figure 4, the low result for laboratory 212 was tested as an outlier (using the Grubbs test) but the result was not significant.

3.06 From Figure 5, the high within laboratory standard deviation for laboratory 61 was tested as an outlier (using Cochran's test) but the result was not significant. The high result for laboratory 61 was also tested as an outlier (using the Grubbs test) and the result was highly significant. Laboratory 61 was therefore deemed to be an outlying laboratory with regard to the results for paper E.

3.07 From Figure 6, the high result for laboratory 161 was tested as an outlier (using the Grubbs test) but the result was not significant.

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4.00 DATA NOT INCLUDED IN SUBSEQUENT ANALYSES

4.01 The data from laboratories 71 and 181 has not been included in any further analyses because the ambient conditions used in these laboratories contravened the conditions of the experimental protocol (see Appendix D).

4.02 The data from laboratory 212 has not been included in any further analyses because the measuring head used by this laboratory (circular area 1 cm. sq.) was not as specified in the experimental protocol (see Appendix D).

4.03 The data from laboratory 61 has not been included in any further analysis of the results for paper E. (See 3.06 above.)

5.00 THE SECOND ANALYSIS

5.01 The first objective of this experiment is to estimate the repeatability r and the reproducibility R of the CORESTA Draft Standard Method for Paper Permeability. (See 1.1.1 of Appendix D).

5.02 The values of r and R can be obtained from an analysis of variance treating between laboratory and within laboratory variability as random effects.

5.03 The results of these analyses are shown in Tables 1 to 6.

5.04 The estimates of r and R shown in Tables 1 to 6 are summarised in Table 7. In Table 7, for the purposes of comparison, r and R are also shown as a percentage of the overall mean permeability for each paper.

5.05 From Table 7 it can be seen that in general both r% and R% are highest for the lower permeability papers, with a tendency for r% and R% to decrease as the mean permeability increases.

5.06 Paper C however displays results which do not conform to this trend. An examination of Table 3 shows that the high value of R% for paper C (when compared to papers F and D) is entirely due to the high value of the within laboratory variability for this paper. There is no evidence to suggest that the between laboratory variability is any higher for paper C (in terms of the percentage of the mean) than for any of the other papers tested in this study.

5.07 This is confirmed by the within and between laboratory standard deviations also shown in Table 7. The values of s% display the same pattern as the values of r% (as expected) but the values for S% do not indicate an unexpectedly high value for paper C.

5.08 The results for paper C demonstrate that the values for r & R obtained from this study may only be applicable to the papers tested in this study.

6.00 THE THIRD ANALYSIS

6.01 The performance (in terms of r and R) of those laboratories using (50±5)%RH at test was compared with the performance of those laboratories using (60±5)%RH. As in 5.02 above, the values of r and R can be obtained from an analysis of variance treating between laboratory and within laboratory variability as random effects.

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6.02 The results of these analyses are shown in Tables 8 to 13.

6.03 The estimates of r and R shown in Tables 8 to 13 are summarised in Tables 14 and 15. In Tables 14 and 15, for the purposes of comparison, r and R are also shown as a percentage of the overall mean permeability for each paper.

6.04 Comparison of Tables 14 and 15 with each other, and with Table 7, shows that there is no appreciable difference in terms of r & R between those laboratories using (50±5)%RH and those using (60±5)%RH.

6.05 The values of s and S shown in Table 15 tend to be lower than those shown in Table 14 but these differences are not significant. It must also be remembered, when comparing tables 14 and 15, that only 4 laboratories used (60±5)%RH whereas at least 20 laboratories used (50±5)%RH.

6.06 For information, the number of laboratories using either (50±5)%RH or (60±5)%RH when testing each of the papers was as follows:-

	(50±5)%RH	(60±5)%RH
Paper A	22	4
Paper B	22	4
Paper C	20	4
Paper D	20	4
Paper E	21	4
Paper F	20	4

6.07 From 6.01 to 6.06 above it is clear that any effect on the value of r and R that may arise from using either (50±5)%RH or (60±5)%RH is too small to be of any practical importance.

7.00 THE FOURTH ANALYSIS

7.01 The second objective of this experiment was to reconfirm the results from Study A concerning the effect (if any) of sucking versus blowing the air through the sample. (See 1.1.2 of Appendix D).

7.02 Table 16 shows, for each paper, the number of data points available for analysis.

7.03 The inequality of the number of data points in the four cells of each of the cross-tabulations shown in Table 16 demonstrates the statistical confounding of the effect of sucking versus blowing with the effect of (50±5)%RH versus (60±5)%RH.

7.04 Thus any effect of changes in relative humidity must be taken into account when estimating the effect, if any, of sucking versus blowing the air through the samples.

7.05 Since the experimental protocol (see Appendix D) provided for only 1 report per day of the relative humidity in the laboratory during testing, the 30 individual measurements taken on each paper each day were averaged to provide 1 data point per day for each paper within each laboratory.

7.06 Thus each of the data points shown in the cross-tabulations in Table 16 is the mean of 30 individual observations.

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7.07 Regression analysis was used to separate, as far as possible, the effect of sucking versus blowing and the effect of humidity.

7.08 A variable was constructed so that laboratories which obtained data by sucking the air through the paper were given the value 1.0 and those laboratories which obtained data by blowing the air through the paper were given the value 2.0.

7.09 Three regressions model were used.

7.10 In the first model the variable constructed as in 7.08 above was used as the only predictor.

7.11 In the second model the observed value of %RH at time of test was used as the only predictor.

7.12 In the third model the variable constructed as in 7.08 above and the observed value of %RH at time of test were used as joint predictors.

7.13 Using the results from these three regressions an analysis of variance was constructed. The analysis of variance for each of the papers A to F are shown in tables 17 to 22.

7.14 From the first two lines of the analysis of variance shown in Table 17 it can be seen that if the effect of sucking versus blowing the air through the sample is taken into the regression first then it is statistically significant (p=0.013). If the effect of relative humidity is then taken into the regression it is not statistically significant (p=0.094).

7.15 From the second two lines of the analysis of variance shown in Table 17 it can be seen that if the effect of relative humidity is taken into the regression first then it is not statistically significant (p=0.096). If the effect of sucking versus blowing the air through the sample is then taken into the regression it is statistically significant (p=0.013).

7.16 Thus, for paper A, the result of the analysis is unambiguous. The effect of sucking versus blowing is statistically significant whether or not the effect of relative humidity is taken into account, whereas the effect of relative humidity is not statistically significant whether or not the effect of sucking versus blowing is taken into account.

7.17 Inspection of Table 18 shows that for paper B the result of this analysis is the same as that for paper A given in 7.16 above.

7.18 Inspection of Table 19 shows that, for paper C, the effect of sucking versus blowing the air through the sample is statistically significant whether or not the effect of relative humidity is taken into account. The effect of relative humidity is significant if it is taken first into the regression (p=0.012) but it only just reaches statistical significance (p=0.050) if it is taken into the regression after the effect of sucking versus blowing.

7.19 Inspection of Table 20 shows that, for paper D, the effect of sucking versus blowing the air through the sample is statistically significant whether or not the effect of relative humidity is taken into account. The effect of relative humidity is significant if it is taken first into the regression (p=0.031) but it is not statistically significance (p=0.090) if it is taken into the regression after the effect of sucking versus blowing.

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7.20 Inspection of Tables 21 and 22 shows that for papers E and F neither the effect of sucking versus blowing nor the effect of relative humidity is statistically significant.

7.21 The results of the analyses of variance shown in Tables 17 to 22 are summarised in Table 23.

7.22 From Table 23 it can be seen that using either (50±5)%RH (ISO 187:1990) or (60±5)%RH (ISO 3402:1991) has no significant effect on the measurement of paper permeability.

7.23 From Table 23 it can be seen that for papers A, B, C, and D the effect of sucking versus blowing the air through the sample is statistically significant. For each of these papers however the magnitude of this effect is less than 62% of the magnitude of r. This would suggest that, for these four papers, the effect of sucking versus blowing, although statistically significant, is of no practical importance.

7.24 From Table 23 it can be seen that for papers E and F the effect of sucking versus blowing the air through the sample is not statistically significant.

Source: https://www.industrydocuments.ucsf.edu/docs/hgmk0001

Figure 1.

PAPER A

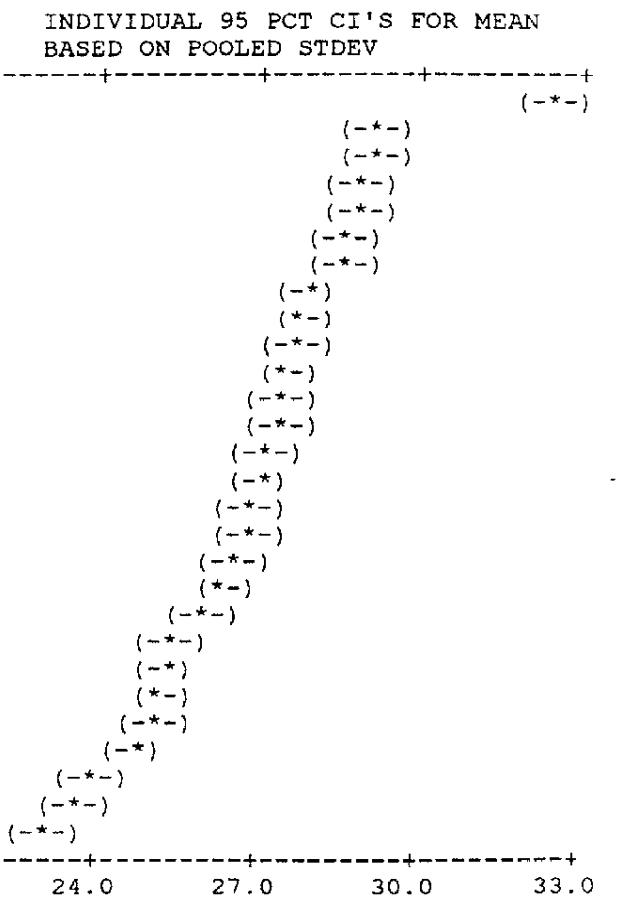
Model:- ANOVA PERM= LABS DAYS(LABS) STRIPS(DAYS);
RANDOM LABS DAYS STRIPS.

Analysis of Variance for PERM

Source	DF	SS	MS	F	P
LAB	27	10268.88	380.33	38.99	0.000
DAY(LAB)	56	546.25	9.75	1.61	0.011
STRIP(LAB DAY)	168	1016.76	6.05	1.91	0.000
Error	2268	7203.36	3.18		
Total	2519	19035.26			

WITHIN-LABORATORY MEANS AND SD's

LAB CODE		N	MEAN	STDEV
61		9	32.299	1.002
51		9	29.139	1.142
61		9	29.074	0.521
31		9	28.864	0.774
31		9	28.821	0.758
181	++	9	28.461	0.925
21		9	28.404	0.563
22		9	27.768	0.895
52	*	9	27.723	0.999
241		9	27.619	1.033
41		9	27.440	0.791
191		9	27.387	1.035
192		9	27.307	0.712
101		9	26.938	1.136
242		9	26.886	0.612
102		9	26.771	0.818
151		9	26.599	0.749
81	*	9	26.367	0.995
121		9	26.244	0.383
171		9	25.787	0.935
31		9	25.182	0.757
141		9	25.067	1.130
111	*	9	25.014	0.504
91		9	24.878	0.712
11		9	24.479	1.084
201		9	23.789	0.697
71	++	9	23.336	0.276
211		9	22.861	0.537



POOLED STDEV = 0.840

Unmarked laboratories used (50±5)%RH ambient conditions
Laboratories marked * used (60±5)%RH ambient conditions
++ Laboratory 181 used 40%RH ambient conditions
++ Laboratory 71 used 68%RH ambient conditions

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Figure 2.

PAPER B

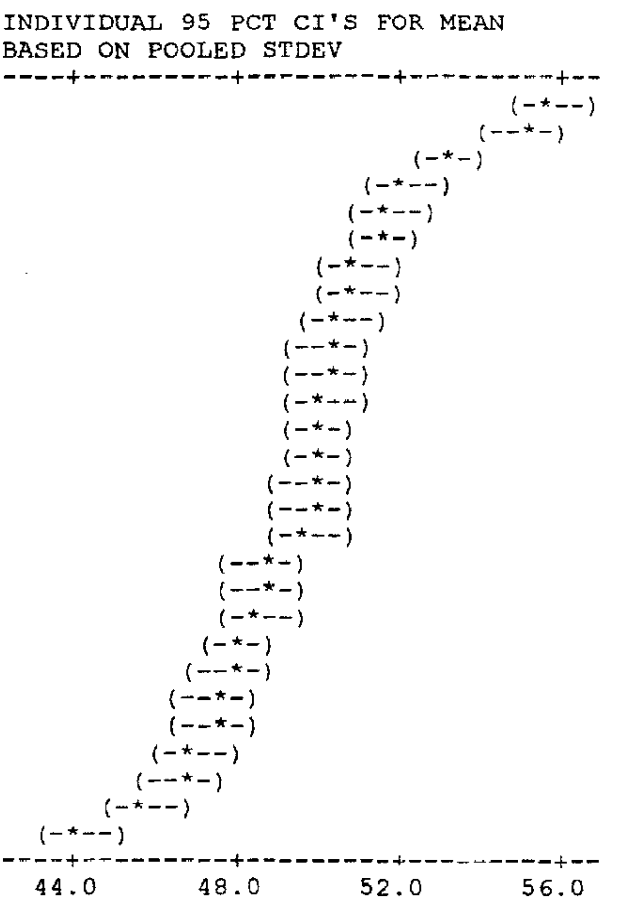
Model:- ANOVA PERM= LABS DAYS(LABS) STRIPS(DAYS);
RANDOM LABS DAYS STRIPS.

Analysis of Variance for PERM

Source	DF	SS	MS	F	P
LAB	27	16067.31	595.09	25.18	0.000
DAY(LAB)	56	1323.68	23.64	1.15	0.244
STRIP(LAB DAY)	168	3444.22	20.50	1.65	0.000
Error	2268	28200.82	12.43		
Total	2519	49036.04			

WITHIN-LABORATORY MEANS AND SD's

LAB CODES		N	MEAN	STDEV
61		9	55.333	1.412
161		9	54.732	1.644
21		9	52.816	1.651
51		9	51.668	1.802
181	++	9	51.261	1.353
131		9	51.158	1.530
231		9	50.597	1.391
22		9	50.534	1.227
192		9	50.060	0.985
81	*	9	49.932	1.178
52	*	9	49.886	1.557
41		9	49.707	1.428
102		9	49.617	1.577
242		9	49.568	1.571
71	++	9	49.547	0.741
241		9	49.436	1.459
191		9	49.244	1.214
91		9	48.269	1.550
101		9	48.324	1.140
151		9	48.160	1.667
121		9	47.561	1.350
171	*	9	47.516	1.506
111	*	9	47.080	0.813
141		9	47.044	2.242
11		9	46.540	1.880
201		9	46.304	1.179
31		9	45.372	1.536
211		9	43.744	1.360



POOLED STDEV = 1.455

Unmarked laboratories used (50±5)%RH ambient conditions
Laboratories marked * used (60±5)%RH ambient conditions
++ Laboratory 181 used 40%RH ambient conditions
++ Laboratory 71 used 68%RH ambient conditions

Source: https://www.industrydocuments.ucsf.edu/docs/hgmk0001

Figure 3.

PAPER C

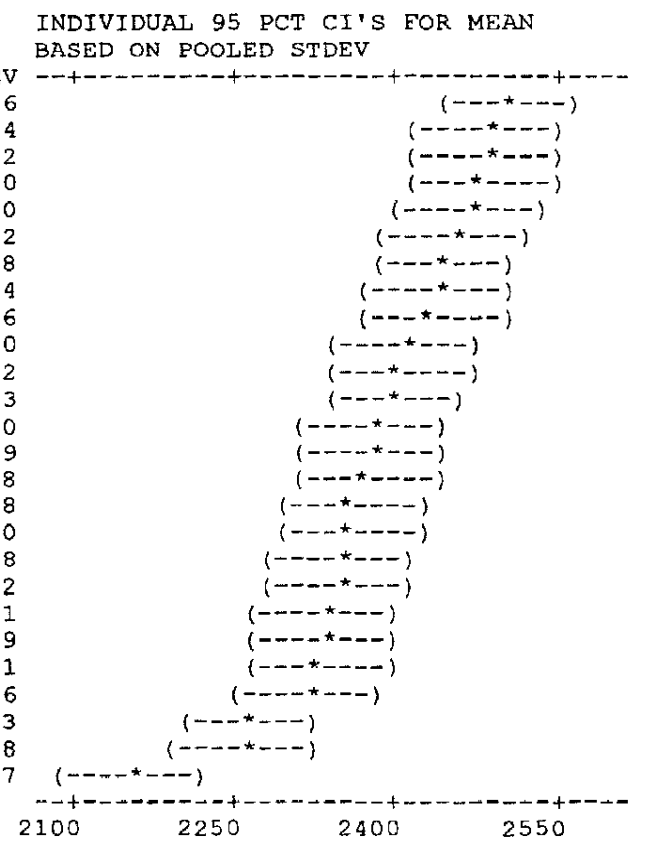
Model:- ANOVA PERM= LABS DAYS(LABS) STRIPS(DAYS);
RANDOM LABS DAYS STRIPS.

Analysis of Variance for PERM

Source	DF	SS	MS	F	P
LAB	25	14803085.	592123.	5.23	0.000
DAY(LAB)	52	5888379	113238	1.19	0.203
STRIP(LAB DAY)	156	14792544	94824	1.20	0.063
Error	2106	166980512	79288		
Total	2339	202464528			

WITHIN-LABORATORY MEANS AND SD's

LAB CODES		N	MEAN	STDEV
131		9	2489.2	60.6
51		9	2471.9	77.4
161		9	2470.7	111.2
242		9	2463.4	103.0
61		9	2455.1	76.0
101		9	2441.3	137.2
21		9	2431.0	149.8
181	++	9	2426.6	117.4
81	*	9	2419.0	52.6
102		9	2393.4	129.0
241		9	2388.4	101.2
191		9	2384.9	107.3
151		9	2366.6	140.0
91		9	2362.2	90.9
231		9	2361.2	37.8
11		9	2347.5	128.8
201		9	2344.5	115.0
141		9	2336.6	88.8
192		9	2335.7	82.2
111	*	9	2322.4	83.1
52	*	9	2319.4	85.9
22		9	2316.9	72.1
41		9	2307.6	88.6
171	*	9	2248.4	75.3
31		9	2246.4	114.8
212		9	2139.5	62.7



POOLED STDEV = 100.0

Unmarked laboratories used (50±5)%RH ambient conditions
Laboratories marked * used (60±5)%RH ambient conditions
++ Laboratory 181 used 40%RH ambient conditions

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Figure 4.

PAPER D

Model:- ANOVA PERM= LABS DAYS(LABS) STRIPS(DAYS);
RANDOM LABS DAYS STRIPS.

Analysis of Variance for PERM

Source	DF	SS	MS	F	P
LAB	25	1193830016	47753200	21.10	0.000
DAY(LAB)	52	117686824	2263208	1.37	0.070
STRIP(LAB DAY)	156	256861680	1646549	4.58	0.000
Error	2106	757893312	359873		
Total	2339	2326272000			

WITHIN-LABORATORY MEANS AND SD's

LAB CODES		N	MEAN	STDEV	INDIVIDUAL 95 PCT CI'S FOR MEAN BASED ON POOLED STDEV
131		9	22667	351	(-*-)
242		9	22428	332	(-*-)
21		9	22042	406	(--*-)
11		9	22009	528	(-*--)
161		9	22008	373	(-*--)
91		9	21951	351	(-*-)
231		9	21946	657	(-*-)
51		9	21931	587	(--*-)
181	++	9	21851	379	(-*-)
201		9	21837	510	(-*-)
22		9	21602	382	(-*-)
31		9	21600	458	(-*-)
101		9	21593	336	(-*-)
111	*	9	21556	398	(--*-)
191		9	21465	525	(-*-)
81	*	9	21183	402	(--*-)
151		9	21087	309	(--*-)
102		9	21078	476	(--*-)
61		9	21034	232	(-*--)
52	*	9	20740	473	(--*-)
241		9	20715	303	(--*-)
41		9	20665	427	(-*--)
192		9	20655	273	(-*-)
141		9	20570	358	(-*--)
171	*	9	20416	397	(-*-)
212		9	19402	513	(--*-)

19200 20400 21600 22800

POOLED STDEV = 427

Unmarked laboratories used (50±5)%RH ambient conditions
Laboratories marked * used (60±5)%RH ambient conditions
++ Laboratory 181 used 40%RH ambient conditions

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Figure 5.

PAPER E

Model:- ANOVA PERM= LABS DAYS(LABS) STRIPS(DAYS);
RANDOM LABS DAYS STRIPS.

Analysis of Variance for PERM

Source	DF	SS	MS	F	P
LAB	26	377361.3	14513.9	31.33	0.000
DAY(LAB)	54	25016.0	463.3	1.15	0.253
STRIP(LAB DAY)	162	65363.1	403.5	2.19	0.000
Error	2187	403781.3	184.6		
Total	2429	871521.8			

WITHIN-LABORATORY MEANS AND SD's

LAB CODES		N	MEAN	STDEV	INDIVIDUAL 95 PCT CI'S FOR MEAN BASED ON POOLED STDEV
61		9	276.26	11.28	(-*-)
41		9	237.57	7.41	(-*-)
161		9	236.53	3.73	(-*-)
101		9	233.08	7.10	(--*-)
131		9	229.74	5.41	(-*-)
81	*	9	225.83	8.73	(-*-)
51		9	225.42	6.71	(-*-)
102		9	224.36	5.73	(-*-)
191		9	224.04	6.54	(-*-)
21		9	224.00	6.16	(-*-)
231		9	223.98	5.69	(-*-)
181	++	9	222.51	6.24	(-*-)
242		9	222.37	4.37	(-*-)
111	*	9	221.20	6.34	(-*-)
241		9	220.93	3.72	(-*--)
121		9	218.81	4.96	(-*--)
201		9	218.77	5.92	(-*-)
151		9	218.34	4.50	(-*-)
22		9	218.07	9.99	(-*-)
91		9	218.06	8.34	(*-)
171	*	9	217.27	4.29	(-*-)
192		9	215.54	5.69	(-*-)
52	*	9	213.91	5.33	(-*-)
11		9	212.65	7.03	(-*-)
211		9	212.34	5.10	(-*-)
31		9	211.00	6.08	(-*--)
141		9	210.70	5.80	(-*-)

220 240 260

POOLED STDEV = 6.39

Unmarked laboratories used (50±5)%RH ambient conditions
Laboratories marked * used (60±5)%RH ambient conditions
++ Laboratory 181 used 40%RH ambient conditions

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Figure 6.

PAPER F

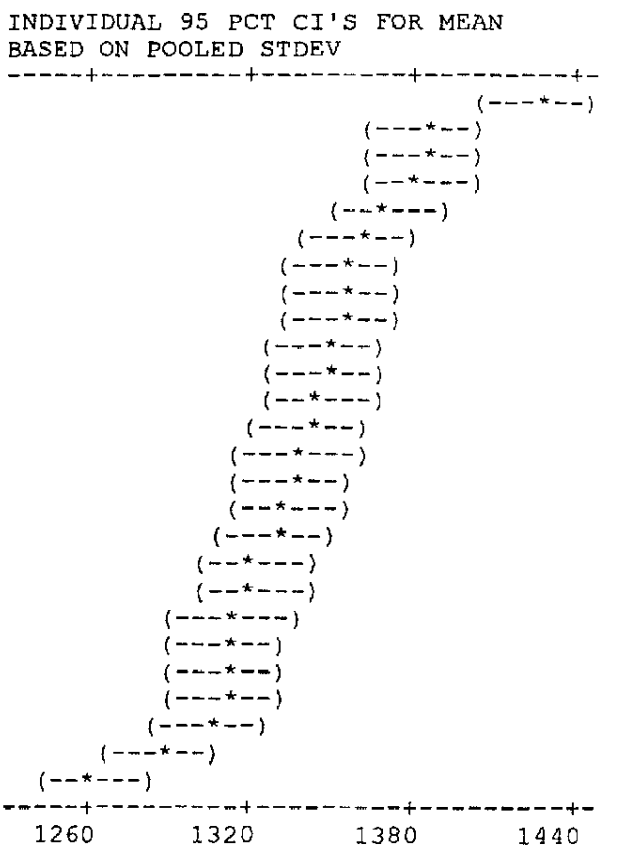
Model:- ANOVA PERM= LABS DAYS(LABS) STRIPS(DAYS);
RANDOM LABS DAYS STRIPS.

Analysis of Variance for PERM

Source	DF	SS	MS	F	P
LAB	25	2600373	104015	4.41	0.000
DAY(LAB)	52	1227175	23600	3.30	0.000
STRIP(LAB DAY)	156	1113936	7141	2.74	0.000
Error	2106	5490545	2607		
Total	2339	10432029			

WITHIN-LABORATORY MEANS AND SD's

LAB CODES		N	MEAN	STDEV
161		9	1420.5	14.1
101		9	1378.9	23.5
41		9	1377.8	25.2
21		9	1375.3	27.4
131		9	1363.4	15.8
51		9	1353.5	20.8
181	++	9	1347.9	22.7
81	*	9	1347.6	22.6
102		9	1347.3	19.2
242		9	1341.5	68.9
231		9	1341.1	60.9
111	*	9	1340.8	23.1
201		9	1335.6	23.8
241		9	1332.0	66.9
151		9	1330.2	18.2
61		9	1328.1	64.5
191		9	1324.1	24.3
91		9	1316.2	31.4
22		9	1315.1	16.8
171	*	9	1308.8	21.7
11		9	1305.9	25.0
212		9	1305.9	14.5
31		9	1305.4	27.0
192		9	1299.8	25.3
52	*	9	1281.5	29.6
141		9	1256.2	33.1



POOLED STDEV = 33.6

Unmarked laboratories used (50±5)%RH ambient conditions
Laboratories marked * used (60±5)%RH ambient conditions
++ Laboratory 181 used 40%RH ambient conditions

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Source: https://www.industrydocuments.ucsf.edu/docs/hgmk0001

Table 1.

SECOND ANALYSIS

BETWEEN AND WITHIN LABORATORY EFFECTS ONLY

Analysis omitting labs:

- 71 (68%RH)
- 181 (40%RH)
- 212 (1 cm sq round head)

PAPER A

Analysis of Variance for PERM

Source	DF	SS	MS	F	P
LAB	25	892.778	35.711	49.90	0.000
Error	208	148.850	0.716		
Total	233	1041.628			

Source	Variance component	Error term	Expected Mean Square (using unrestricted model)
1 LAB	3.8884	2	(2) + 9.0000(1)
2 Error	0.7156		(2)

r = 2.3686 **R = 6.0080**

PM3000984278

Source: https://www.industrydocuments.ucsf.edu/docs/hgmk0001

Table 2.

SECOND ANALYSIS

Between and Within Laboratory effects only

ANALYSIS OMITTING LABS

- 71 (68%RH)
- 181 (40%RH)
- 212 (1 CM SQ ROUND HEAD)

PAPER B

Analysis of Variance for PERM

Source	DF	SS	MS	F	P
LAB	25	1570.806	62.832	28.55	0.000
Error	208	457.758	2.201		
Total	233	2028.564			

Source	Variance component	Error term	Expected Mean Square (using unrestricted model)
1 LAB	6.737	2	(2) + 9.0000(1)
2 Error	2.201		(2)

r = 4.1538 **R = 8.3708**

PM3000984279

Source: https://www.industrydocuments.ucsf.edu/docs/hgmk0001

Table 3.

SECOND ANALYSIS

Between and Within Laboratory effects only

ANALYSIS OMITTING LABS

- 1 (68%RH)
- 81 (40%RH)
- 212 (1 CM SQ ROUND HEAD)

PAPER C

Analysis of Variance for PERM

Source	DF	SS	MS	F	P
LAB	23	965851	41994	4.19	0.000
Error	192	1926413	10033		
Total	215	2892264			

Source	Variance component	Error term	Expected Mean Square (using unrestricted model)
1 LAB	3551	2	(2) + 9.0000(1)
2 Error	10033		(2)

r = 280.47 R = 326.35

PM3000984280

Source: https://www.industrydocuments.ucsf.edu/docs/hgmk0001

Table 4.

SECOND ANALYSIS

Between and Within Laboratory effects only

ANALYSIS OMITTING LABS

- 71 (68%RH)
- 181 (40%RH)
- 212 (1 CM SQ ROUND HEAD)

PAPER D

Analysis of Variance for PERM

Source	DF	SS	MS	F	P
LAB	23	81167192	3529009	19.81	0.000
Error	192	34202268	178137		
Total	215	115369464			

Source	Variance component	Error term	Expected Mean Square (using unrestricted model)
1 LAB	372319	2	(2) + 9.0000(1)
2 Error	178137		(2)

r = 1181.8 **R = 2077.4**

PM3000984281

Source: https://www.industrydocuments.ucsf.edu/docs/hgmk0001

Table 5.

SECOND ANALYSIS

Between and Within Laboratory effects only

ANALYSIS OMITTING LABS

- 61 (OUTLIER)
- 71 (68%RH)
- 181 (40%RH)
- 212 (1 CM SQ ROUND HEAD)

PAPER E

Analysis of Variance for PERM

Source	DF	SS	MS	F	P
LAB	24	11669.08	486.21	12.62	0.000
Error	200	7707.29	38.54		
Total	224	19376.37			

Source	Variance component	Error term	Expected Mean Square (using unrestricted model)
1 LAB	49.74	2	(2) + 9.0000(1)
2 Error	38.54		(2)

r = 17.382 **R = 26.308**

PM3000984282

Source: https://www.industrydocuments.ucsf.edu/docs/hgmk0001

Table 6.

SECOND ANALYSIS

Between and Within Laboratory effects only

ANALYSIS OMITTING LABS

- 71 (68%RH)
- 181 (40%RH)
- 212 (1 CM SQ ROUND HEAD)

PAPER F

Analysis of Variance for PERM

Source	DF	SS	MS	F	P
LAB	23	251191	10921	9.18	0.000
Error	192	228312	1189		
Total	215	479503			

Source	Variance component	Error term	Expected Mean Square (using unrestricted model)
1 LAB	1081	2	(2) + 9.0000(1)
2 Error	1189		(2)

r = 96.554 **R = 133.42**

PM3000984283

Source: https://www.industrydocuments.ucsf.edu/docs/hgmk0001

Table 7.

SECOND ANALYSIS

TABLE OF r AND R FOR EACH PAPER

Table ordered in ascending mean permeability

	Mean	r	r %	R	R%
Paper A	26.87	2.37	8.81	6.01	22.4
Paper B	49.24	4.15	8.44	8.37	17.0
Paper E	221.4	17.4	7.85	26.3	11.9
Paper F	1334.4	96.6	7.24	133.4	10.0
Paper C	2376	280.5	11.8	326.4	13.7
Paper D	21449	1182	5.51	2077	9.69

$$r\% = \frac{100 \times r}{\text{Mean}} \qquad R\% = \frac{100 \times R}{\text{Mean}}$$

WITHIN and BETWEEN LABORATORIES STANDARD DEVIATIONS

	Mean	s	s%	S	S%
Paper A	26.87	0.846	3.15	1.972	7.34
Paper B	49.24	1.484	3.01	2.596	5.27
Paper E	221.4	6.208	2.80	7.053	3.19
Paper F	1334.4	34.48	2.58	32.88	2.46
Paper C	2376	100.2	4.22	59.59	2.51
Paper D	21449	422.1	1.97	610.2	2.84

where:

s = within-laboratory standard deviation
S = between-laboratory standard deviation

$$s\% = \frac{100 \times s}{\text{Mean}} = \text{coeff. var.} \qquad S\% = \frac{100 \times S}{\text{Mean}} = \text{coeff. var.}$$

PM3000984284

Source: https://www.industrydocuments.ucsf.edu/docs/hgmk0001

Table 8.

THIRD ANALYSIS

Between and Within Laboratory effects only

ANALYSIS OMITTING LABS

- 71 (68%RH)
- 181 (40%RH)
- 212 (1 CM SQ ROUND HEAD)

PAPER A

LABORATORIES USING (50±5)%RH AT TEST

Analysis of Variance for PERM

Source	DF	SS	MS	F	P
LAB	21	839.468	39.975	56.77	0.000
Error	176	123.925	0.704		
Total	197	963.393			

Source	Variance component	Error term	Expected Mean Square (using unrestricted model)
1 LAB	4.3634	2	(2) + 9.0000(1)
2 Error	0.7041		(2)

r = 2.3495 **R = 6.3031**

LABORATORIES USING (60±5)%RH AT TEST

Analysis of Variance for PERM

Source	DF	SS	MS	F	P
LAB	3	35.304	11.768	15.11	0.000
Error	32	24.924	0.779		
Total	35	60.228			

Source	Variance component	Error term	Expected Mean Square (using unrestricted model)
1 LAB	1.2210	2	(2) + 9.0000(1)
2 Error	0.7789		(2)

r = 2.4711 **R = 3.9597**

PM3000984285

Source: https://www.industrydocuments.ucsf.edu/docs/hgmk0001

Table 9.

THIRD ANALYSIS

Between and Within Laboratory effects only

ANALYSIS OMITTING LABS

- 71 (68%RH)
- 181 (40%RH)
- 212 (1 CM SQ ROUND HEAD)

PAPER B

LABORATORIES USING (50±5)%RH AT TEST

Analysis of Variance for PERM

Source	DF	SS	MS	F	P
LAB	21	1491.414	71.020	30.95	0.000
Error	176	403.832	2.295		
Total	197	1895.247			

Source	Variance component	Error term	Expected Mean Square (using unrestricted model)
1 LAB	7.636	2	(2) + 9.0000(1)
2 Error	2.295		(2)

r = 4.2413 **R = 8.8236**

LABORATORIES USING (60±5)%RH AT TEST

Analysis of Variance for PERM

Source	DF	SS	MS	F	P
LAB	3	62.225	20.742	12.31	0.000
Error	32	53.925	1.685		
Total	35	116.150			

Source	Variance component	Error term	Expected Mean Square (using unrestricted model)
1 LAB	2.117	2	(2) + 9.0000(1)
2 Error	1.685		(2)

r = 3.6348 **R = 5.4600**

PM3000984286

Source: https://www.industrydocuments.ucsf.edu/docs/hgmk0001

Table 10.

THIRD ANALYSIS

Between and Within Laboratory effects only

ANALYSIS OMITTING LABS

- 71 (68%RH)
- 181 (40%RH)
- 212 (1 CM SQ ROUND HEAD)

PAPER C

LABORATORIES USING (50±5)%RH AT TEST

Analysis of Variance for PERM

Source	DF	SS	MS	F	P
LAB	19	731079	38478	3.53	0.000
Error	160	1744618	10904		
Total	179	2475697			

Source	Variance component	Error term	Expected Mean Square (using unrestricted model)
1 LAB	3064	2	(2) + 9.0000(1)
2 Error	10904		(2)

r = 292.38 **R = 330.92**

LABORATORIES USING (60±5)%RH AT TEST

Analysis of Variance for PERM

Source	DF	SS	MS	F	P
LAB	3	132491	44164	7.77	0.000
Error	32	181795	5681		
Total	35	314287			

Source	Variance component	Error term	Expected Mean Square (using unrestricted model)
1 LAB	4276	2	(2) + 9.0000(1)
2 Error	5681		(2)

r = 211.04 **R = 279.40**

Source: https://www.industrydocuments.ucsf.edu/docs/hgmk0001

Table 11.

THIRD ANALYSIS

Between and Within Laboratory effects only

ANALYSIS OMITTING LABS

- 71 (68%RH)
- 181 (40%RH)
- 212 (1 CM SQ ROUND HEAD)

PAPER D

LABORATORIES USING (50±5)%RH AT TEST

Analysis of Variance for PERM

Source	DF	SS	MS	F	P
LAB	19	64669024	3403633	19.05	0.000
Error	160	28582084	178638		
Total	179	93251104			

Source	Variance component	Error term	Expected Mean Square (using unrestricted model)
1 LAB	358333	2	(2) + 9.0000(1)
2 Error	178638		(2)

r = 1183.4 **R = 2051.8**

LABORATORIES USING (60±5)%RH AT TEST

Analysis of Variance for PERM

Source	DF	SS	MS	F	P
LAB	3	6737603	2245868	12.79	0.000
Error	32	5620184	175631		
Total	35	12357787			

Source	Variance component	Error term	Expected Mean Square (using unrestricted model)
1 LAB	230026	2	(2) + 9.0000(1)
2 Error	175631		(2)

r = 1173.4 **R = 1783.4**

PM3000984288

Source: https://www.industrydocuments.ucsf.edu/docs/hgmk0001

Table 12.

THIRD ANALYSIS

Between and Within Laboratory effects only

ANALYSIS OMITTING LABS

- 61 (OUTLIER)
- 71 (68%RH)
- 181 (40%RH)
- 212 (1 CM SQ ROUND HEAD)

PAPER E

LABORATORIES USING (50±5)%RH AT TEST

Analysis of Variance for PERM

Source	DF	SS	MS	F	P
LAB	20	10812.94	540.65	14.19	0.000
Error	168	6400.97	38.10		
Total	188	17213.91			

Source	Variance component	Error term	Expected Mean Square (using unrestricted model)
1 LAB	55.84	2	(2) + 9.0000(1)
2 Error	38.10		(2)

r = 17.283 **R = 27.138**

LABORATORIES USING (60±5)%RH AT TEST

Analysis of Variance for PERM

Source	DF	SS	MS	F	P
LAB	3	712.92	237.64	5.82	0.003
Error	32	1306.31	40.82		
Total	35	2019.23			

Source	Variance component	Error term	Expected Mean Square (using unrestricted model)
1 LAB	21.87	2	(2) + 9.0000(1)
2 Error	40.82		(2)

r = 17.890 **R = 22.170**

PM3000984289

Source: https://www.industrydocuments.ucsf.edu/docs/hgmk0001

Table 13.

THIRD ANALYSIS

Between and Within Laboratory effects only

ANALYSIS OMITTING LABS

- 71 (68%RH)
- 181 (40%RH)
- 212 (1 CM SQ ROUND HEAD)

PAPER F

LABORATORIES USING (50±5)%RH AT TEST

Analysis of Variance for PERM

Source	DF	SS	MS	F	P
LAB	19	216576	11399	8.72	0.000
Error	160	209152	1307		
Total	179	425727			

Source	Variance component	Error term	Expected Mean Square (using unrestricted model)
1 LAB	1121	2	(2) + 9.0000(1)
2 Error	1307		(2)

r = 101.23 **R = 137.98**

LABORATORIES USING (60±5)%RH AT TEST

Analysis of Variance for PERM

Source	DF	SS	MS	F	P
LAB	3	25193.9	8398.0	14.03	0.000
Error	32	19159.9	598.7		
Total	35	44353.8			

Source	Variance component	Error term	Expected Mean Square (using unrestricted model)
1 LAB	866.6	2	(2) + 9.0000(1)
2 Error	598.7		(2)

r = 68.514 **R = 107.18**

PM3000984290

Source: https://www.industrydocuments.ucsf.edu/docs/hgmk0001

Table 14.

THIRD ANALYSIS

TABLE OF r AND R FOR EACH PAPER

TABLE ORDERED IN ASCENDING MEAN PERMEABILITY

DATA FROM LABORATORIES USING (50±5)%RH

	Mean	r	r%	R	R%
Paper A	26.99	2.35	8.70	6.30	23.4
Paper B	49.35	4.24	8.59	8.82	17.9
Paper E	221.7	17.3	7.79	27.1	12.2
Paper F	1337	101.2	7.57	138.0	10.3
Paper C	2386	292.4	2.3	330.9	13.9
Paper D	21544	1183	5.49	2052	9.52

$$r\% = \frac{100 \times r}{\text{Mean}} \qquad R\% = \frac{100 \times R}{\text{Mean}}$$

WITHIN and BETWEEN LABORATORIES STANDARD DEVIATIONS

DATA FROM LABORATORIES USING (50±5)%RH

	Mean	s	s%	S	S%
Paper A	26.99	0.839	3.11	2.089	7.74
Paper B	49.35	1.515	3.07	2.763	5.60
Paper E	221.7	6.173	2.78	7.473	3.37
Paper F	1337	36.15	2.70	33.48	2.50
Paper C	2386	104.42	4.38	55.35	2.32
Paper D	21544	422.7	1.96	598.6	2.78

s = within-laboratory standard deviation
S = between-laboratory standard deviation

$$s\% = \frac{100 \times s}{\text{Mean}} = \text{coeff. var.} \qquad S\% = \frac{100 \times S}{\text{Mean}} = \text{coeff. var.}$$

PM3000984291

Source: https://www.industrydocuments.ucsf.edu/docs/hgmk0001

Table 15.

THIRD ANALYSIS

TABLE OF r AND R FOR EACH PAPER

TABLE ORDERED IN ASCENDING MEAN PERMEABILITY

DATA FROM LABORATORIES USING (60±5)%RH

	Mean	r	r%	R	R%
Paper A	26.22	2.47	9.42	3.96	15.1
Paper B	48.60	3.63	7.48	5.46	11.2
Paper E	219.6	17.9	8.15	22.2	10.1
Paper F	1320	68.5	5.19	107.2	8.12
Paper C	2327	211.0	9.07	279.4	12.0
Paper D	20974	1173	5.59	1783	8.50

$$r\% = \frac{100 \times r}{\text{Mean}} \quad R\% = \frac{100 \times R}{\text{Mean}}$$

WITHIN and BETWEEN LABORATORIES STANDARD DEVIATIONS

DATA FROM LABORATORIES USING (60±5)%RH

	Mean	s	s%	S	S%
Paper A	26.22	0.883	3.37	1.105	4.21
Paper B	48.60	1.298	2.67	1.455	2.99
Paper E	219.6	6.389	2.91	4.677	2.13
Paper F	1320	24.47	1.85	29.44	2.23
Paper C	2327	75.37	3.24	65.39	2.81
Paper D	20974	419.1	2.00	479.6	2.29

s = within-laboratory standard deviation
S = between-laboratory standard deviation

$$s\% = \frac{100 \times s}{\text{Mean}} = \text{coeff. var.} \quad S\% = \frac{100 \times S}{\text{Mean}} = \text{coeff. var.}$$

PM3000984292

Source: https://www.industrydocuments.ucsf.edu/docs/hgmk0001

Table 16.

FOURTH ANALYSIS

CROSS-TABULATION OF SUCK v BLOW and 50% v 60%RH

NUMBER OF DATA POINTS

ANALYSIS OMITTING LABS

- 71 (68%RH)
- 181 (40%RH)
- 212 (1 CM SQU ROUND HEAD)

		50%RH	60%RH	ALL
PAPER A	SUCK	15	3	18
	BLOW	51	9	60
	ALL	66	12	78
PAPER B	SUCK	15	3	18
	BLOW	51	9	60
	ALL	66	12	78
PAPER C	SUCK	9	3	12
	BLOW	51	9	60
	ALL	60	12	72
PAPER D	SUCK	9	3	12
	BLOW	51	9	60
	ALL	60	12	72
PAPER E LAB 61 OMITTED	SUCK	15	3	18
	BLOW	48	9	57
	ALL	63	12	75
PAPER F	SUCK	9	3	12
	BLOW	51	9	60
	ALL	60	12	72

Source: https://www.industrydocuments.ucsf.edu/docs/hgmk0001

Table 17.

FOURTH ANALYSIS

REGRESSION ANALYSIS OF SUCK v BLOW and 50%RH v 60%RH

ANALYSIS OMITTING LABS 71 181 212

PAPER A

Model 1

The regression equation is PERM = 24.5 + 1.32 SU_V_BL

Predictor	Coef	Stdev	t-ratio	p
Constant	24.5325	0.9567	25.64	0.000
SU_V_BL	1.3231	0.5260	2.52	0.014

Regression Sum of Squares 24.239

Model 2.

The regression equation is PERM = 31.3 - 0.0850 RH%

Predictor	Coef	Stdev	t-ratio	p
Constant	31.349	2.760	11.36	0.000
RH%	-0.08498	0.05223	-1.63	0.108

Regression Sum of Squares10.618

Model 3.

The regression equation is PERM = 29.0 - 0.0855 RH% + 1.33 SU_V_BL

Predictor	Coef	Stdev	t-ratio	p
Constant	29.028	2.816	10.31	0.000
SU_V_BL	1.3265	0.5197	2.55	0.013

Regression Sum of Squares 34.979

Analysis of Variance

SOURCE	DF	SS	MS	F	p
SUCK v BLOW	1	24.239	24.239	6.48	0.013
RH%| SU_V_BL	1	10.740	10.740	2.87	0.094
RH%	1	10.618	10.618	2.84	0.096
SU_V_BL| RH%	1	24.361	24.361	6.52	0.013
Error	75	280.446	3.739		
Total	77	315.426			

Cross-tabulation of Mean Permeability

	50%RH	60%RH	ALL
SUCK	25.869	25.787	25.856
BLOW	27.322	26.368	27.179
ALL	26.992	26.223	26.873

SUCK-BLOW = -1.323 (-4.9%)
50%RH-60%RH = 0.769 (2.9%)

PM3000984294

Source: https://www.industrydocuments.ucsf.edu/docs/hgmk0001

Table 18

FOURTH ANALYSIS

REGRESSION ANALYSIS OF SUCK v BLOW and 50%RH v 60%RH

ANALYSIS OMITTING LABS 71 181 212

PAPER B

Model 1.

The regression equation is PERM = 44.6 + 2.62 SU_V_BL

Predictor	Coef	Stdev	t-ratio	p
Constant	44.602	1.217	36.66	0.000
SU_V_BL	2.6207	0.6690	3.92	0.000

Regression Sum of Squares95.098

Model 2.

The regression equation is PERM = 53.6 - 0.0826 RH%

Predictor	Coef	Stdev	t-ratio	p
Constant	53.593	3.691	14.52	0.000
RH%	-0.08262	0.06979	-1.18	0.240

Regression Sum of Squares10.251

Model 3.

The regression equation is PERM = 48.7 - 0.0778 RH% + 2.60 SU_V_BL

Predictor	Coef	Stdev	t-ratio	p
Constant	48.728	3.609	13.50	0.000
RH%	-0.07775	0.06405	-1.21	0.229
SU_V_BL	2.6050	0.6670	3.91	0.000

Regression Sum of Squares 104.172

Analysis of Variance

SOURCE	DF	SS	MS	F	p
SUCK v BLOW	1	95.098	95.098	15.44	0.000
RH%| SU_V_BL	1	9.074	9.074	1.47	0.229
RH%	1	10.251	10.251	1.66	0.201
SU_V_BL| RH%	1	93.921	93.921	15.25	0.000
Error	75	461.891	6.159		
Total	77	566.064			

Cross-tabulation of Mean Permeability

	50%RH	60%RH	ALL
SUCK	47.164	47.516	47.223
BLOW	49.998	48.966	49.843
ALL	49.354	48.603	49.239

SUCK-BLOW = -2.620 (-5.3%)
50%RH-60%RH = 0.751 (1.5%)

PM3000984295

Source: https://www.industrydocuments.ucsf.edu/docs/hgmk0001

Table 19.

FOURTH ANALYSIS

REGRESSION ANALYSIS OF SUCK v BLOW and 50%RH v 60%RH

ANALYSIS OMITTING LABS 71 181 212

PAPER C

Model 1.

The regression equation is PERM = 2204 + 93.9 SU_V_BL

Predictor	Coef	Stdev	t-ratio	p
Constant	2203.80	46.17	47.73	0.000
SU_V_BL	93.92	24.68	3.81	0.000

Regression Sum of Squares88207

Model 2.

The regression equation is PERM = 2659 - 5.35 RH%

Predictor	Coef	Stdev	t-ratio	p
Constant	2659.4	119.5	22.25	0.000
RH%	-5.352	2.250	-2.38	0.020

Regression Sum of Squares38493

Model 3.

The regression equation is PERM = 2440 - 4.21 RH% + 86.4 SU_V_BL

Predictor	Coef	Stdev	t-ratio	p
Constant	2440.5	126.9	19.23	0.000
RH%	-4.210	2.110	-2.00	0.050
SU_V_BL	86.44	24.46	3.53	0.001

Regression Sum of Squares 111469

Analysis of Variance

SOURCE	DF	SS	MS	F	p
SUCK v BLOW	1	88207	88207	15.10	0.000
RH%| SU_V_BL	1	23262	23262	3.98	0.050
RH%	1	38493	38493	6.59	0.012
SU_V_BL| RH%	1	76576	76576	13.11	0.001
Error	69	403161	5843		
Total	71	514630			

Cross-tabulation of Mean Permeability

	50%RH	60%RH	ALL
SUCK	2314.1	2248.4	2297.7
BLOW	2398.3	2353.6	2391.6
ALL	2385.7	2327.3	2376.0

SUCK-BLOW = -93.9 (-4.0%)
50%RH-60%RH = 58.4 (2.5%)

Source: https://www.industrydocuments.ucsf.edu/docs/hgmk0001

Table 20.

FOURTH ANALYSIS

REGRESSION ANALYSIS OF SUCK v BLOW and 50%RH v 60%RH

ANALYSIS OMITTING LABS 71 181 212

PAPER D

Model 1.

The regression equation is PERM = 20128 + 720 SU_V_BL

Predictor	Coef	Stdev	t-ratio	p
Constant	20128.5	357.4	56.32	0.000
SU_V_BL	720.3	191.0	3.77	0.000

Regression Sum of Squares 5189041

Model 2.IN C4 ON 1 PRED IN C7

The regression equation is PERM = 23374 - 36.4 RH%

Predictor	Coef	Stdev	t-ratio	p
Constant	23374.1	945.2	24.73	0.000
RH%	-36.37	17.80	-2.04	0.045

Regression Sum of Squares 1729826

Model 3.

The regression equation is PERM = 21718 - 28.5 RH% + 677 SU_V_BL

Predictor	Coef	Stdev	t-ratio	p
Constant	21718.2	990.8	21.92	0.000
RH%	-28.54	16.63	-1.72	0.090
SU_V_BL	677.2	190.1	3.56	0.001

Regression Sum of Squares 6235697

Analysis of Variance

SOURCE	DF	SS	MS	F	p
SUCK v BLOW	1	5189041	5189041	14.61	0.000
RH%| SU_V_BL	1	1046656	1046656	2.95	0.090
RH%	1	1729826	1729826	4.87	0.031
SU_V_BL| RH%	1	4505871	4505871	12.69	0.001
Error	69	24501302	355091		
Total	71	30737000			

Cross-tabulation of Mean Permeability

	50%RH	60%RH	ALL			
SUCK	20993	20416	20849	SUCK-BLOW	= -720	(-3.4%)
BLOW	21641	21160	21569	50%RH-60%RH	= 570	(2.7%)
ALL	21544	20974	21449			

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Source: https://www.industrydocuments.ucsf.edu/docs/hgmk0001

Table 21.

FOURTH ANALYSIS

REGRESSION ANALYSIS OF SUCK v BLOW and 50%RH v 60%RH

ANALYSIS OMITTING LABS 61 71 181 212

PAPER E

Model 1.

The regression equation is PERM = 217 + 2.27 SU_V_BL

Predictor	Coef	Stdev	t-ratio	p
Constant	217.380	3.847	56.51	0.000
SU_V_BL	2.273	2.124	1.07	0.288

Regression Sum of Squares 70.69

Model 2.

The regression equation is PERM = 224 - 0.051 RH%

Predictor	Coef	Stdev	t-ratio	p
Constant	224.07	11.07	20.24	0.000
RH%	-0.0509	0.2091	-0.24	0.808

Regression Sum of Squares 3.72

Model 3.

The regression equation is PERM = 220 - 0.053 RH% + 2.28 SU_V_BL

Predictor	Coef	Stdev	t-ratio	p
Constant	220.18	11.65	18.90	0.000
RH%	-0.0533	0.2089	-0.26	0.799
SU_V_BL	2.279	2.138	1.07	0.290

Regression Sum of Squares 74.76

Analysis of Variance

SOURCE	DF	SS	MS	F	p
SUCK v BLOW	1	70.69	70.69	1.13	0.291
RH%| SU_V_BL	1	4.07	4.07	0.06	0.799
RH%	1	3.72	3.72	0.06	0.808
SU_V_BL| RH%	1	71.04	71.04	1.14	0.290
Error	72	4501.42	62.52		
Total	74	4576.18			

Cross-tabulation of Mean Permeability

	50%RH	60%RH	ALL
SUCK	220.13	217.27	219.65
BLOW	222.23	220.31	221.93
ALL	221.73	219.55	221.38

SUCK-BLOW = -2.28 (-1.0%)
50%RH-60%RH = 2.18 (1.0%)

Source: https://www.industrydocuments.ucsf.edu/docs/hgmk0001

Table 22.

FOURTH ANALYSIS

REGRESSION ANALYSIS OF SUCK v BLOW and 50%RH v 60%RH

ANALYSIS OMITTING LABS 71 181 212

PAPER F

Model 1.

The regression equation is PERM = 1327 + 4.1 SU_V_BL

Predictor	Coef	Stdev	t-ratio	p
Constant	1326.88	24.81	53.47	0.000
SU_V_BL	4.12	13.26	0.31	0.757

Regression Sum of Squares170

Model 2.

The regression equation is PERM = 1392 - 1.09 RH%

Predictor	Coef	Stdev	t-ratio	p
Constant	1392.04	61.00	22.82	0.000
RH%	-1.087	1.147	-0.95	0.347

Regression Sum of Squares1561

Model 3.

The regression equation is PERM = 1387 - 1.06 RH% + 2.1 SU_V_BL

Predictor	Coef	Stdev	t-ratio	p
Constant	1386.61	70.77	19.59	0.000
RH%	-1.057	1.172	-0.90	0.370
SU_V_BL	2.08	13.47	0.15	0.878

Regression Sum of Squares1604

Analysis of Variance

SOURCE	DF	SS	MS	F	p
SUCK v BLOW	1	170	170	0.10	0.757
RH%| SU_V_BL	1	1434	1434	0.81	0.370
RH%	1	1561	1561	0.88	0.350
SU_V)BL| RH%	1	43	43	0.02	0.876
Error	69	121719	1764		
Total	71	123322			

Cross-tabulation of Mean Permeability

	50%RH	60%RH	ALL
SUCK	1338.4	1308.8	1331.0
BLOW	1337.2	1323.3	1335.1
ALL	1337.4	1319.7	1334.4

SUCK-BLOW = -4.1 (-0.3%)
50%RH-60%RH = 17.7 (1.3%)

PM3000984299

Source: https://www.industrydocuments.ucsf.edu/docs/hgmk0001

Table 23.

SUMMARY OF RESULTS OF REGRESSION ANALYSES

SUCK v BLOW and 50%RH v 60%RH

		SUCK v BLOW			50% v 60% RH		
		DIFF			DIFF		
PAPER A	r = 2.37 R = 6.01	-1.32	-4.9%	SIG	0.77	2.9%	NS
PAPER B	r = 4.24 R = 8.37	-2.62	-5.3%	SIG	0.75	1.5%	NS
PAPER C	r = 280.5 R = 326.4	-93.9	-4.0%	SIG	58.4	2.5%	+ns
PAPER D	r = 1182 R = 2077	-720	-3.4%	SIG	570	2.7%	ns
PAPER E	r = 17.40 R = 26.30	-2.28	-1.0%	NS	2.18	1.0%	NS
PAPER F	r = 96.60 R = 133.4	-4.1	-0.3%	NS	17.7	1.3%	NS

In the above table, DIFF for SUCK v BLOW is the difference in mean permeability between laboratories sucking air through the paper and laboratories blowing air through the paper. The difference is calculated as (SUCK-BLOW).

In the above table, DIFF for 50%RH v 60%RH is the difference in mean permeability between laboratories using 50%RH and laboratories using 60%RH. The difference is calculatedas (50%RH-60%RH).

The percentage values of DIFF are the values of (SUCK-BLOW) and (50%RH-60%RH) expressed as percentages of the mean permeability.

Note:-

1. *The effect of %RH for paper C, shown as +ns in the above table, is statistically significant if the effect of sucking versus blowing is omitted from the analysis, but it is only marginally significant if the effect of sucking versus blowing is taken into the regression analysis first.*
2. *The effect of % RH for paper d, shown as ns in the above table, is statistically significant if ithe effect of sucking versus blowing is omitted from the analysis.*

Source: https://www.industrydocuments.ucsf.edu/docs/hgmk0001